CLAIMS

What is claimed is:

1. An optical router in an optical communication system for routing multiplexed signals having a plurality of wavelengths that create a spectrum through the communication system by spatially shifting the wavelengths, said optical router including an output element comprising:

a linear element for receiving the signals having the plurality of wavelengths and for dispersing the spectrum into discrete regions onto an intermediate image plane;

a discontinuous optical element in optical communication with the intermediate image plane for laterally shifting the discrete regions by predetermined lengths to produce a laterally shifted spectrum, each of said predetermined lengths being associated with one of the discrete regions; and

a re-imaging optical element for receiving the laterally shifted spectrum and for removing the dispersion created by said linear element and for re-imaging the spectrum onto the output element.

2. The optical router of claim 1, wherein said linear element comprises a micro-optic array.

3. The optical router of claim 2, wherein said micro-optic array comprises a plurality of input fibers each is adapted to transmit one of the plurality of wavelengths.

4. The optical router of claim 1, wherein said linear element comprises a

micro-electromechanical structure tilt mirror that is electromechanically actuatable.

5. The optical router of claim 1, wherein said discontinuous optical element comprises a grating.

6. The optical router of claim 5, wherein said grating comprises a silicon wafer and a plurality of v-shaped grooves defined in the silicon wafer.

7. The optical router of claim 1, wherein said discontinuous optical element comprises a micro-electromechanical structure (MEMS) tilt mirror plate.

8. The optical router of claim 1, wherein said re-imaging optical element comprises a lens for receiving the spatially shifted spectrum and a grating for removing the dispersion and focusing the received spatially diffused spectrum onto the output element of the router.

9. The optical router of claim 1, wherein said re-imaging element comprises a concave mirror.

10. A method for routing optical signals having a plurality of wavelengths that create a spectrum through an optical communication system by spatially shifting the wavelengths, comprising the steps of:

linearly imaging the spectrum into discrete regions and onto an intermediate image plane, wherein the imaging step introduces linear dispersion into the spectrum;

laterally shifting the discrete regions by predetermined lengths to produce a

laterally shifted spectrum, each of said predetermined lengths being associated with one of the discrete regions; and

re-imaging the laterally shifted spectrum to remove the linear dispersion introduced by said imaging step and for outputting the latterly shifted spectrum onto an output element in the optical communication system.

11. The method of claim 10, wherein said shifting step comprises diffracting the spectrum to introduce lateral space shifts to the discrete regions.

12. The method of claim 11, wherein said shifting step further comprises reflecting the laterally spaced shifted spectrum with an array of reflecting mirrors before re-imaging the spectrum.

13. The method of claim 10, wherein said re-imaging step further comprises reflecting the shifted, linearly dispersed spectrum through an element for removing the linear dispersion.